

7.1-7.3 Review

① Multiply

$$\textcircled{a} \sqrt{2} \cdot \sqrt{8} = \sqrt{16} = \boxed{4}$$

$$\textcircled{b} 2\sqrt{7} \cdot 4\sqrt{3} = \boxed{8\sqrt{21}}$$

② Add

$$\begin{array}{l} \textcircled{a} \quad 3\sqrt{5} + 4\sqrt{45} \\ \quad \quad \downarrow \quad \downarrow \quad \downarrow \\ \quad \quad 4 \cdot \sqrt{9} \sqrt{5} \\ \quad \quad \downarrow \quad \downarrow \\ \quad \quad 4 \cdot 3 \cdot \sqrt{5} \\ \quad \quad \downarrow \\ 3\sqrt{5} + 12\sqrt{5} = \boxed{15\sqrt{5}} \end{array}$$

$$\begin{array}{l} \textcircled{b} \quad 2\sqrt{8} + 3\sqrt{32} \\ \quad \quad \downarrow \quad \quad \downarrow \\ 2\sqrt{4 \cdot 2} \quad 3 \cdot \sqrt{16 \cdot 2} \\ 2 \cdot 2\sqrt{2} \quad 3 \cdot 4\sqrt{2} \\ 4\sqrt{2} + 12\sqrt{2} = \boxed{16\sqrt{2}} \end{array}$$

③ Simplify

$$\textcircled{a} \frac{(2x^2y^3)^2}{2x^2x^3y} = \frac{4x^4y^6}{2x^5y} = 2x^{-1}y^5 = \boxed{\frac{2y^5}{x}}$$

$$\textcircled{b} \sqrt{32x^5y} \rightarrow \sqrt{16 \cdot \sqrt{2}} \quad \sqrt{x^5y} = \underline{\underline{x^2\sqrt{xy}}} = \boxed{4x^2\sqrt{2xy}}$$

$$\textcircled{c} \sqrt[3]{128x^4y^2} \rightarrow \sqrt[3]{128} = \sqrt[3]{64 \cdot 2} = \underline{\underline{4 \cdot \sqrt[3]{2}}} \quad \sqrt[3]{x^4y^2} = \underline{\underline{x\sqrt[3]{xy^2}}} = \boxed{4x\sqrt[3]{2xy^2}}$$

$$\textcircled{d} \sqrt[3]{64x^2y^2z^4} \rightarrow \sqrt[3]{64} = \underline{\underline{4}} \quad \sqrt[3]{x^2y^2z^4} = \underline{\underline{z\sqrt[3]{x^2y^2z}}} = \boxed{4z\sqrt[3]{x^2y^2z}}$$

④ Rationalize

$$\textcircled{a} \frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \boxed{\frac{\sqrt{5}}{5}}$$

$$\textcircled{b} \frac{2\sqrt[3]{3}}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{2}}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{2}}{\sqrt[3]{2}} = \frac{\cancel{2}\sqrt[3]{12}}{\cancel{2}} = \boxed{\sqrt[3]{12}}$$

$$\textcircled{c} \frac{4}{1+\sqrt{2}} \cdot \frac{1-\sqrt{2}}{1-\sqrt{2}} = \frac{4-4\sqrt{2}}{-1} = \boxed{-4+4\sqrt{2}}$$

$$\textcircled{d} \frac{3+\sqrt{2}}{2-\sqrt{5}} \cdot \frac{2+\sqrt{5}}{2+\sqrt{5}} = \frac{6+3\sqrt{5}+2\sqrt{2}+\sqrt{10}}{-1} = \boxed{-6-3\sqrt{5}-2\sqrt{2}-\sqrt{10}}$$

⑤ Simplify

$$a) (2+\sqrt{5})(3+2\sqrt{5}) = 6 + 4\sqrt{5} + 3\sqrt{5} + 2\sqrt{25} = \boxed{16 + 7\sqrt{5}}$$

$$b) (\sqrt{3} + \sqrt{5})(\sqrt{3} - \sqrt{5}) = \sqrt{9} - \sqrt{25} = \boxed{-2}$$

$$c) \frac{x^2 \cdot x^4}{(2y^2x)^2} \cdot x^{-3} = \frac{x^3}{4y^4x^2} = \boxed{\frac{x}{4y^4}}$$

$$\begin{aligned} d) (3+5\sqrt{3})^2 &= (3+5\sqrt{3})(3+5\sqrt{3}) \\ &= 9 + 15\sqrt{3} + 15\sqrt{3} + 25\sqrt{9} \\ &= 9 + 30\sqrt{3} + 75 \\ &= \boxed{84 + 30\sqrt{3}} \end{aligned}$$